

the origin of plant-form and structure as a direct response to the stimulation of its environment. The book is well illustrated by blocks nearly all of which are old friends (though the source is rarely indicated; many are borrowed from Johns' "Flowers of the Field"). There are also a number of, generally poor, coloured plates.

(3) Mr. Grove's pocket synopsis of the families of British Flowering Plants is a systematic enumeration of the characters of these families arranged under their orders and larger groups, on the lines of the system adopted by Engler in his "Syllabus." It is carefully compiled and "is intended primarily to facilitate the determination of the families of British plants by students." Most students will, however, probably wish to proceed further than the family and will prefer to use handbooks already in existence which enable them to do this.

TEXT-BOOKS OF CHEMISTRY.

- (1) *Intermediate Practical Chemistry for University Students*. By F. W. Attack. Pp. viii+204. (London: Sherratt and Hughes, 1914.) Price 4s. net.
- (2) *The Manufacture of Organic Dyestuffs*. By Prof. A. Wahl. Translated by F. W. Attack. Pp. xiv+338. (London: G. Bell and Sons, Ltd., 1914.) Price 5s. net.
- (3) *Outlines of Organic Chemistry*. A book designed especially for the General Student. By Dr. F. J. Moore. 2nd edition. Pp. xi+325. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1914.) Price 6s. 6d. net.
- (4) *Elementary Practical Chemistry for Medical and Other Students*. By J. E. Myers and J. B. Firth. Pp. viii+194. (London: C. Griffin and Co., Ltd., 1914.) Price 4s. net.
- (5) *A Text-book of Inorganic Chemistry*. Vol. i. Part i., An Introduction to Modern Inorganic Chemistry. By Dr. J. N. Friend, H. F. V. Little, and W. E. S. Turner. Part ii., The Inert Gases. By H. V. A. Briscoe. Pp. xv+385. (London: C. Griffin and Co., Ltd., 1914.) Price 10s. 6d. net.

(1) **T**HIS little volume presents in some respects an original method of treating practical chemistry. After the usual preliminary description of the wash-bottle and its applications, etc., a series of above one hundred little qualitative and quantitative experiments are introduced, the interpretation of which the student is expected to supply. These are excellent so far as they go, but an occasional grouping of the observed phenomena might have been introduced with advantage

as a sort of sign-post to the student. The usual tables are, however, postponed until the student is conversant with "identifications" by the dry way. After a very full account of qualitative analysis by the wet way, which includes tests for the rare metals, a section is devoted to preparations of pure substances and to gravimetric and volumetric analysis. The book is, in short, a very useful compendium of practical inorganic chemistry, and for those who intend to become professional chemists it may be unreservedly recommended.

(2) This book on organic dyestuffs is a translation from the French of Prof. A. Wahl, who fills the chair of industrial chemistry in the University of Nancy. We have it on the authority of Dr. Knecht, who has written a short introductory notice, that it supplies a real want, and that it was, in fact, at his suggestion that "this excellent little book" was translated.

It deals essentially with the production of the dyes from the raw material, and includes an account of the distillation of coal tar and the manipulation of the intermediate products. It enters neither into the theory of organic chemistry nor into the application of the dyes to the fibre. The student is therefore recommended to equip himself beforehand with a substantial knowledge of organic chemistry. Moreover, the book does not profess to transform the student into a practical colour-maker, for few details of the actual manufacture or the character of the plant are supplied. We may presume, therefore, that he will receive the necessary practical training concurrently with the study of the text-book if he intends to enter this branch of industry. For we cannot conceive how any student of ordinary intelligence can commit to memory the description of such a variety of compounds, many of which possess highly complex formulæ, without some pegs of practical experimental work to hang his information on.

The publication of this little volume comes at an opportune moment, when it is highly desirable that the interest of young chemists should be stimulated in the direction of colour-making. It is noteworthy that at the end of the volume the list of books of reference which is given includes a substantial number of English and French, in addition to German authors.

(3) Dr. Moore's "Outlines of Organic Chemistry," published originally in 1910, has now reached a second edition. The new edition, whilst retaining the original character and arrangement, represents a thorough revision, and includes the description of a number of new substances of practical interest, namely, citric acid, the fulminates,

and the chemistry of rubber, tannin, and the cyanides. The book is sufficiently well known to need no elaborate description.

(4) The "Elementary Practical Chemistry" by Messrs. Myers and Firth is written mainly for medical students, who, according to the authors, have experienced a long-felt want of this particular kind of aid to practical work. The information, though neither new in substance nor arrangement, is selected in accordance with the syllabuses of most of the medical examining bodies in order, it is presumed, that the overworked medical student may not expend his energies in stepping beyond their well-defined boundaries. This remark is not made in any spirit of cynicism, for it is becoming more and more evident that, with the present overcrowded courses in other branches besides that of medicine, special instruction must be devised for particular classes of students.

We have no hesitation in recommending the book, not only to medical students but to any class of beginners, as a useful introduction to practical chemistry. It is divided into four parts; the first deals with chemical manipulation and a variety of preparations, the second with qualitative, the third with quantitative analysis, and the final chapter is devoted to organic analysis. We would submit two suggestions to the consideration of the authors, though, perhaps, they overstep the syllabus; to combine rough quantitative measurements with such preparations as the reduction of copper sulphate to copper or the preparation of quicklime from marble, to which they readily lend themselves. There seems no reason to wait until part iii. is reached. The second point is to modify part iv. so as to introduce a group of simple organic preparations before entering on the qualitative side of the subject. We confess to having our misgivings as to the value of this section.

Organic chemistry, as represented by organic compounds used in medicine, is not to-day what it was a quarter of a century ago, and the perfunctory testing of a few dozen of the simplest substances selected from the wide range of complex medical preparations now manufactured has neither an educational nor a practical value. It is, of course, not the authors, but the syllabus which is at fault, for the growing importance of organic chemistry for the medical man demands a much more intimate knowledge than most of the syllabuses are devised to meet.

(5) Dr. J. N. Friend, the editor of this new text-book of inorganic chemistry, points out that, whilst physical and analytical chemistry have been comprehensively dealt with in the form of text-

books, inorganic chemistry can show no similar publication, and the present projected series of nine volumes is intended to fill the gap. Each volume is written by one or more authors, well known and accredited in the chemical world, so that the new volumes, so far as authorship is concerned, hold out every promise of success. That the series, if efficiently done, will be welcomed by those who can afford to purchase it, almost goes without saying; but it is to be feared that nine volumes at ten shillings and sixpence each will appeal more to public libraries than to private purses.

After reading through several chapters and dipping into others, the impression we have received is entirely favourable. The matter is not only well and thoughtfully arranged and clearly expressed, but (what is less common in the larger text-books containing great masses of condensed information) it is presented in an attractive, literary form. Whilst giving full weight to the many excellent features of the work, it is not, perhaps, irrelevant to inquire for what class of readers it is written. It is obviously not a work of reference, such, for example, as Dammer's "Handbuch." It is too big and costly to serve as a text-book for advanced students, though there is much that they might read with profit. The question, in short, is whether a big and expensive text-book affords the best means of conveying to a large number of readers the latest discoveries in a growing science like chemistry. It generally means the reiteration of a large amount of elementary matter, with an expenditure of space which could be more profitably applied to expanding the subject on its less familiar side.

To take an example from the present volume, a chapter on the classification of the elements leads naturally to the familiar facts of the periodic law, which is discussed at some length. Our interest having been stimulated up to this point, we come upon a paragraph entitled "Modifications of the Periodic System," in which we are informed that there is no space to discuss it, our curiosity having to be appeased with three-quarters of a page of references. The work of the Braggs on molecular structure, which is certainly among the most important contributions to the subject during the present century, is relegated to a footnote with numerous references, and there are many other examples of the same kind. It is as if we had been invited to take a journey into foreign lands, and, having started, had been presented with a Baedeker instead.

We are strongly of opinion that, with a mobile science, the system of cheap monographs, which

can without great cost be from time to time re-edited, would serve the more useful purpose of bringing the subject up to date, and of reaching, by reason of their cheapness, a larger number of readers than this more costly form of advanced literature, excellent though it may be. J. B. C.

THE PHYSICAL BASIS OF GEOGRAPHY.

Physical Geography. By P. Lake. Pp. xx+324. (Cambridge: At the University Press, 1915.) Price 7s. 6d. net.

PHYSICAL geography is already represented by numerous elementary text-books, and by other more ambitious works, most of which deal with particular branches of the subject. Mr. Lake's book occupies an intermediate position, being suitable for the needs of teachers and university students. The result is admirable, and the author is to be congratulated, not only on the accuracy of the subject matter, but also on the lucidity and attractiveness of his treatment.

The book is divided into three sections, dealing in turn with the atmosphere, the oceans, and the lands. The first of these is perhaps the most valuable, or at least calls for most praise, for climate and weather, being still imperfectly understood even by their special students, have afforded many a pitfall for the unwary writers of general text-books. Any attempt at undue simplicity is to be deprecated in the interests of accuracy, and Mr. Lake has steered a happy course between the temptation to describe ideal cases, on the one hand, and the danger of citing confusing masses of actual meteorological data, on the other. The author points out the desirability of planning a teaching-course so that the study of the atmosphere occupies the winter session, leaving the land to the summer months when field excursions can be taken.

In the section dealing with the oceans, the chapter on waves and tides should be particularly useful to the student, for these subjects are effectively handled with enviable ease. A chapter is devoted to coral reefs and islands, and the views of Darwin and Murray are presented, but no mention is made of Daly's recent contribution to the controversy, in which he correlates the formation of atolls and barrier reefs with the lowering of sea-level that accompanied the Pleistocene glaciation, and its subsequent rise as the ice melted (*Amer. Journ. Sci.*, 1910, p. 297). The chapters which treat of the land are uniformly good. They constitute a delightful exposition of dynamical geology, and one feels that they are all too short. The temptation to have written more must have been strong, for rivers, and

glaciers, and volcanoes have a way of leading one further and further afield in the realm of earth-lore. Mr. Lake has written just enough in this, and in the other sections, to fire the student with interest, and no text-book can hope to achieve more.

The book is well illustrated with twenty plates, 162 figures in the text, and a series of maps illustrating isobars, isotherms and rainfall, those of the latter being coloured. Altogether it is a very refreshing text-book, and it has the advantage of satisfying a real need in the teaching of physical geography. ARTHUR HOLMES.

OUR BOOKSHELF.

Smithsonian Physical Tables. Sixth revised edition. Prepared by F. E. Fowle. Pp. xxxvi + 355. (Washington: Smithsonian Institution, 1914.)

THESE physical tables, originally compiled by Prof. Thomas Gray in 1896, have been revised by Mr. F. E. Fowle, of the Smithsonian Astrophysical Observatory. The number of tables has been increased from 335 in the fifth to more than 400 in the sixth edition. The new matter includes a new set of wire tables from advance sheets supplied by the Bureau of Standards, mathematical tables compiled by Mr. C. E. Van Orstrand, and data relating to Röntgen rays and radio-activity. Thus we find a table giving Moseley's atomic numbers and the wave-lengths of lines in the X-ray spectra of the elements. We miss, however, determinations of the ratio of the charge to the mass of an electron. The mass of an electron is very nearly 9×10^{-28} grams, not 6×10^{-28} grams (Table 406). Sadler, on p. 336, no doubt through association with Barkla, becomes Sadla! It would be useful to have the value of the electro-chemical equivalent given for some elements other than silver. These, however, are minor blemishes, and actual use of the tables during two months has proved their great value. It is not too much praise to say that a copy should be in every scientific library and advanced physical laboratory. It may be of service to state that the volume may be obtained in Great Britain, where it should be more widely known, through Messrs. Wm. Wesley and Son, Essex Street, Strand, W.C., at 8s. 6d. net.

The Design of Steam Boilers and Pressure Vessels.

By Prof. G. B. Haven and Prof. G. W. Swett. Pp. vii+416. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1915.) Price 12s. 6d. net.

THIS book is a comprehensive treatise on the design of steam boilers and other vessels subjected to internal fluid pressure. The subject naturally divides itself into questions of strength, of providing dimensions suitable for the thermal operations involved, and the production of working drawings embodying the results of the calculations. The authors have endeavoured to harmonise the rational methods of both theory and practice;